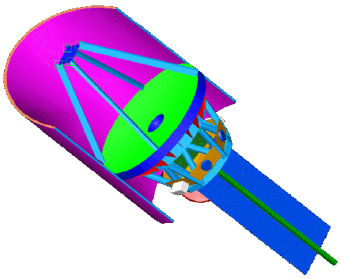
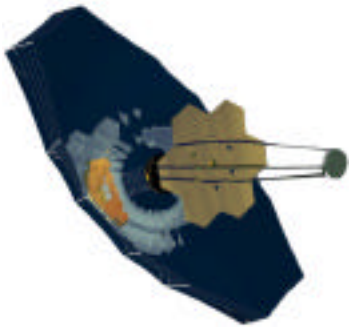
Next Generation Space Telescope NGST

"Visiting a time when galaxies were young" - HST & Beyond

GSFC



Lockheed-Martin



TRW

NGST concepts

Science Objectives

- Study the birth of the first galaxies
- Determine the shape and fate of the Universe
- Study formation of stars and planets
- Observe the chemical evolution of the Universe
- Probe the nature of dark matter

Technology Highlights

- Precision deployable & inflatable structures
- Large, low areal density cold active optics
- Simulation based design
- Passive cooling
- Autonomous operations & onboard scheduling

NGST Mission Profile

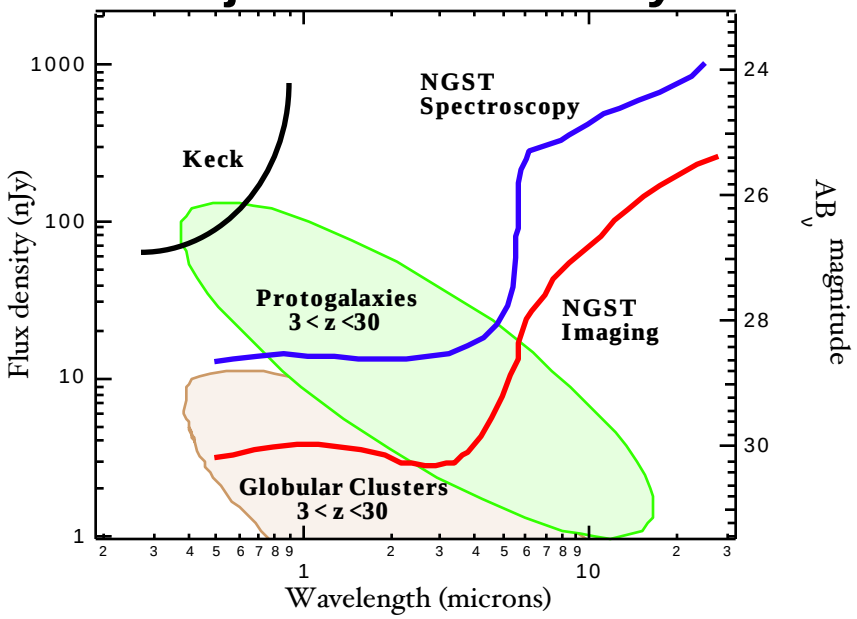
Parameter	Requirement	Goal
Wavelength Range	1-5 µm	0.5-30µm
Aperture Diameter	>4m	>8m
Angular Resolution	Diffraction-limited at 2µm	Diffraction limited at 0.5µm
Spectral Resolution	100 - 1000	100 - 3000
Optics Temperature	< 60K	30K
Field of View	4'x4' at 1-5µm	add 2'x2' coverage 5-30µm
Sensitivity	Zodiacal background limited at 1 A.U. orbit	Cosmic infrared background limited
Instantaneous sky coverage	> 20% available	
Mission sky coverage	100% available	
Lifetime	5 years	10 years
Orbit	L2 or 1 A.U. drift	1x3 A.U.

NGST Web Site http://ngst.gsfc.nasa.gov/

Core Science Programs

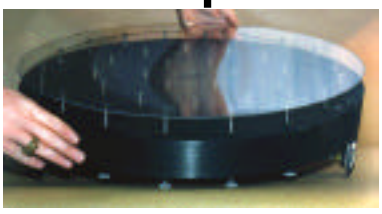
Target Class	Study Objective	Target AB magnitudes
Deep Fields	One deep field (down to AB magnitude 32) and 100 less deep (AB 30) flanking fields will be observed in broad band filters	30-32
Universe at redshifts z > 2	Primeval spheroids, birth and evolution of disks, the origin of heavy elements, birth and evolution of AGN	29 (near-IR) 26 (thermal-IR)
Supernovae study	Improve our knowledge of the geometry of the Universe and study the material universe before the birth of galaxies	31
Stellar populations in the nearby universe	Color-magnitude to the horizontal branch luminosity both in the optical and in the near	30.5-32
Cosmic Distances	Studies based on gravitational lensing and gravitational time delays, determine dark matter distribution	27
Kuiper Belt object searches	Statistically meaningful study of their properties as well as of the distribution in space	30 (near-IR) 25 (thermal-IR)
Individual object classes	Variety of studies in both imaging and spectroscopy that can take advantage of the NGST performance, e.g., star formation and the late stages of stellar evolution	

Projected Sensitivity

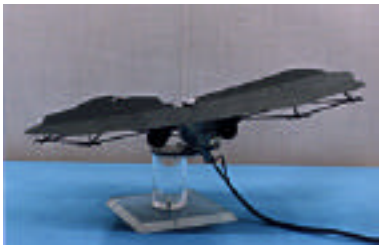


Sensitivity of an 8m diameter NGST compared with various astronomical phenomena in the early universe. The NGST curves, show the signal-to-noise=10 response in 10000 seconds for wide band imaging modes and low resolution spectroscopy (R~100).

Hardware Development

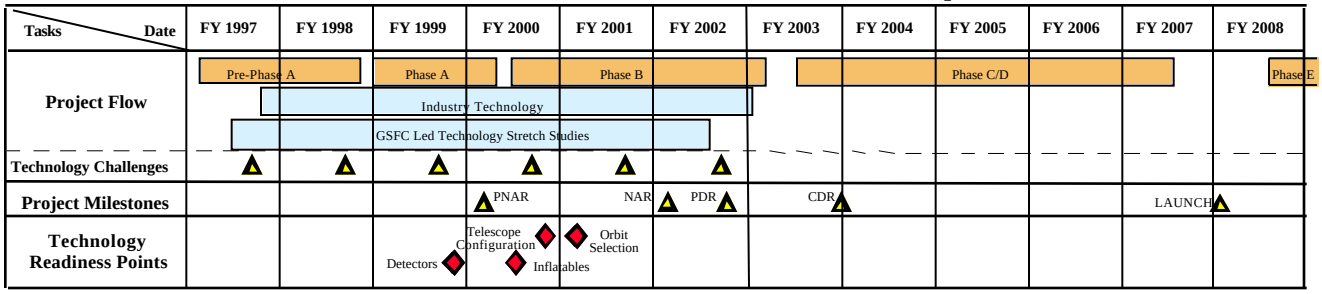


Prototype active membrane mirror (d = 0.5m, thickness = 2mm) developed by the Univ. of Arizona



Precision deployable structure model developed by TRW.

Proposed Timetable



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